

# How **West Ohio's** Custom Cutting Tools Lower Cost Per-Part



Founders Kim and Kerry Buchenroth are preparing to celebrate their 70th wedding anniversary: “35 years for Kim and 35 years for me” says Kerry.

**W**hen Buck Buchenroth of West Ohio Tool Co. tells you what really sets them apart is the “relationships we’ve built with our employees, our customers, and our vendors” you might be tempted to roll your eyes. Until you consider that:

- President Kerry Buchenroth spends most of his time at the customer’s spindle, not at West Ohio and not in your purchasing manager’s office

## Ten-fold improvement in duty cycle



The tool on the left needed rework after only 1,200-1,500 hits, could be reground only five times, and produced a “rat’s nest” of cut material that forced frequent shut downs. West Ohio’s new tool (right) combines a longer step, a helical flute, and a special end face gash. It eliminates the nesting problem and handles 15,000 hits and 30 to 40 regrinds.

## Why faster speeds are so important

Four Scenarios	Today	30% Tool Discount	50% Longer Tool Life	20% Cutting Speed Increase
<b>Variable Costs</b>				
• Cutting Tools	\$ .30	\$ .21	\$ .20	\$ .45
• Workpiece Materials	\$1.70	\$1.70	\$1.70	\$1.70
<b>Fixed Costs</b>				
• Machinery	\$2.70	\$2.70	\$2.70	\$2.16
• Labor	\$3.10	\$3.10	\$3.10	\$2.48
• Building & Administrative	\$2.20	\$2.20	\$2.20	\$1.76
<b>Cost Per Part</b>	\$10.00	\$9.91	\$9.90	\$8.55
<b>SAVINGS</b>	–	1%	1%	15%

Table provided by Sandvik Coromant Co. Fair Lawn, NJ

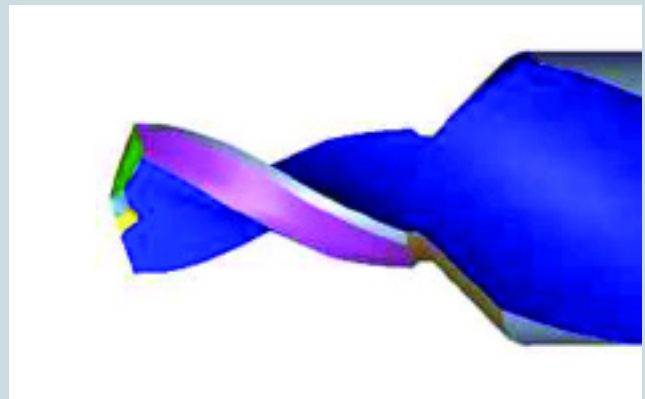
- They specialize in custom drills, reamers, and step tools and rarely touch endmills
- They generally manage to lower both cost-per-part and tool cost (it's common for them to improve tool life ten-fold in a given application)
- They don't compete on fast delivery or price. Doesn't mean they're slow or expensive. But they work with you on big improvements, not quick fixes or shaving pennies.

And that's just for openers. The more you learn about West Ohio, the more you realize this "relationship thing" is not just real - it pays big dividends. Because as Sandvik's data shows (see chart below), a custom cutting tool can greatly lower the cost per part.

### Founder has been on both ends of the cutting tool business

Kerry Buchenroth started machining at Clark Equipment, making big equipment like drag lines and cranes. It's in

### Strange new drill geometries...



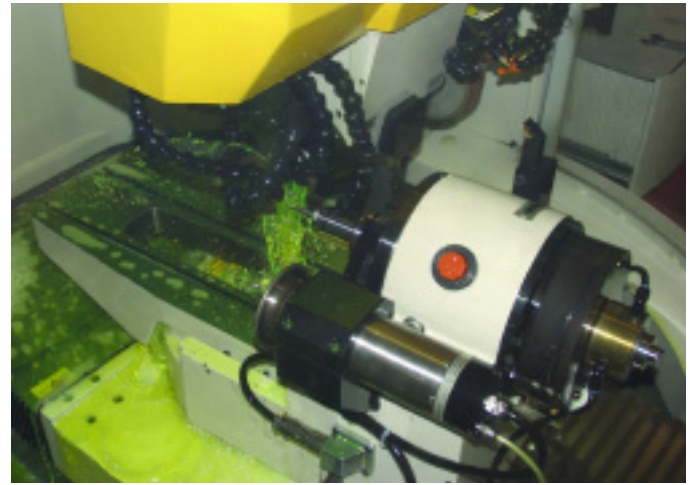
A 30° helix on the wider part of the tool would normally result in a much "slower" helix on the pilot, as pictured to the left. But West Ohio invented a tool (pictured on the right) with a fast 30° helix on the pilot blended into a fast 30° straight flute on the body. This new combo tool eliminated a tool change, improved tool life, and cut cycle time.



Corey inspects a step tool on the Walter Helicheck, with a repeatable accuracy of +/- 0.7 microns. West Ohio inspects the first and a random sampling of every 10th tool in a batch. "Tolerance to us, is a given," says Buck.

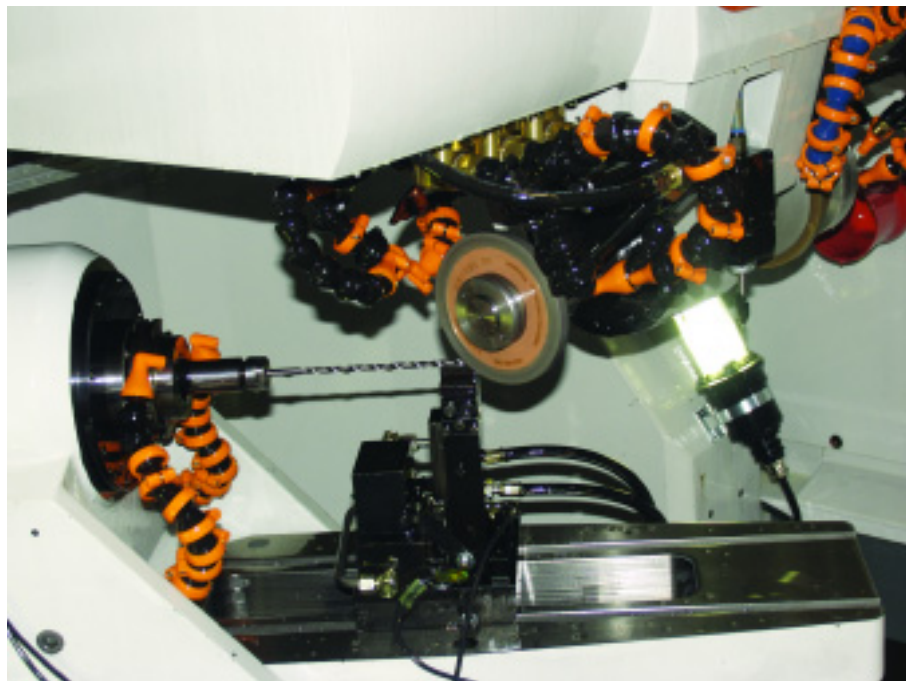
that context (as someone trying to solve specific manufacturing problems) that he got into tool grinding. When Clark shut down Kerry helped a few other companies with their tool grinding needs. Or as he puts it: "Oh, you know how to grind that? Then grind this! So you had to figure out how to grind the next tool. School of hard knocks is all that it was."

Kerry joined Honda as a production supervisor in the Marysville, OH assembly plant in 1983 and was then part of the select group that started the new engine plant near Anna, OH. Both tooling and machining fell under him, and he later combined the knowledge he'd gained in both disciplines when he moved to Honda Engineering to design and build production lines. Now that he's left Honda, he's



About 15% of West Ohio's business is in PCD tooling, one being eroded here on a Walter Helitronic Power Diamond machine. They don't see the automotive market for PCD tooling growing much until it becomes easier to "vein" PCD into a tool body

often supplying tools to run on the very same equipment he built for them during the 80's and 90's.



This long drill running on the Helitronic Vision is for power transmissions. It's been tweaked so closely to the application that when a new engineer offered the project to four other suppliers, the West Ohio tool outperformed them all 4:1.

Cincinnati Monoset and grinding metalworking tools. Scouring the used machine and auction listings eventually yielded some opportunities, one of which led to a

### A little West Ohio "corn farmer" history

Kerry started West Ohio Tool Co. in 1989 in a 10 x 16 foot room in the back of his garage. He was still full-time with Honda, but back in production and concentrating on tooling so he could hone his skills in that area. Oddly, his new tool company found its first niche grinding carbide saw blades and chain saws. But Kerry dreamt of getting a

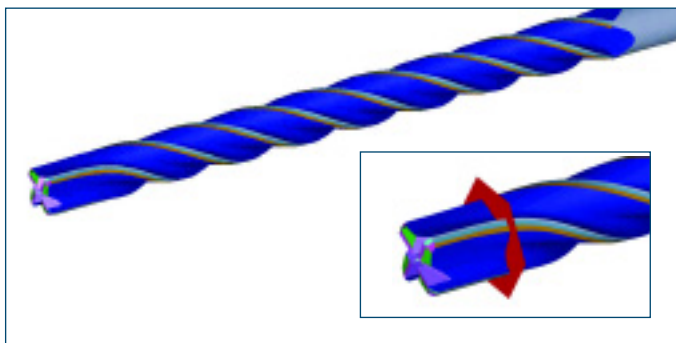


West Ohio designed this drill burnish for a deep hole aluminum application. It combines a straight flute for high speed penetration with a helical form for chip evacuation

Pennsylvania back-country grind shop in a chicken coop. It was more than he could afford at the time, but Kerry and wife Kim wrestled the Monoset onto their beater Chevy pick-up truck and drove the back roads home, leaning to one side all the way. “Yeah, we were the Clampetts back then,” Kim jokes.

After doubling the room in the garage, Kerry rebuilt a 28 x 32 foot barn and moved his machines there. They still had beef cows on the property, so “we needed a new barn anyway,” Kerry chuckles. Kim says the FedEx driver wouldn’t deliver their packages because he was afraid of the horse flies. “He’d stay in the truck and pitch our stuff.” But horseflies or not, Kerry’s dream was starting to flourish. He had two Monosets and was grinding metalworking tools. By 1993 he quit Honda.

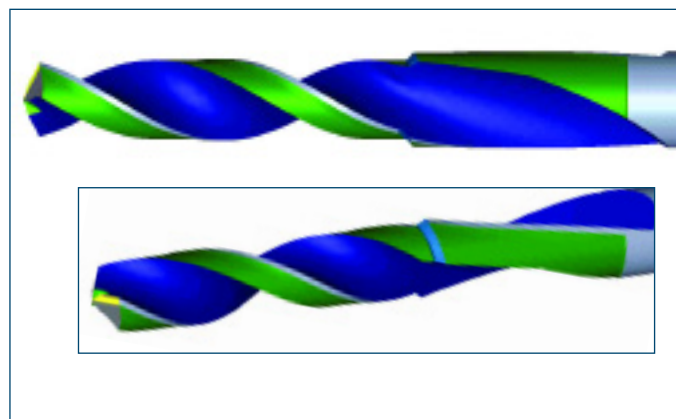
By 1994 it was clear they needed yet another building, so they ordered a 60 x 80 steel barn kit. Kerry and Kim would grind all day and build the barn at night. Their son Buck joined the company in August, 1996 and the



This experimental “blended” reamer goes from a straight to a helical flute for vertical cast iron machining. (Note the difference between the helix at the red cross section from farther down the tool.) The customer had been changing tools every 5,000 hits, plus scrapping over 30 parts per shift due to inconsistent hole diameters and quality. West Ohio’s new tool has eliminated the quality problems and is still running at over 17,000 parts.

building was finished by Thanksgiving. Daughter, Kaci, joined the team in January, 1998 to take care of the accounting and tax work. By 2000 it was apparent they needed more room and the “barn behind the house” image did not match the quality of their tools, so planning began for their 21,000 sq. ft. production facility in an industrial park. West Ohio has been “off the farm” since 2001.

## The vendor relationship - Walter’s president loses a bet



This tool was designed for a dedicated vertical machine drilling aluminum. The machine delivered acceptable coolant volume, but coolant was being pulled out of the hole before it could get to the bottom, plus chips were loading at the top of the flute. West Ohio slowed the helix at the top of the flute to allow more coolant into the hole and to improve chip evacuation. This has eliminated tool breakage, which had averaged twelve tools per month.

West Ohio Tool combines an amazing ability to adapt a variety of equipment to suit their needs and fearlessness about adopting new technology. Kerry had his eye on the Walter Helitronic Power CNC tool grinder the minute he learned about the machine in late 1995. By June of the following year he was ready to take the plunge, but Ditmar Weselin, Walter’s president in the US, tried to talk them out of it, fearing it would be too much machine for them. Weselin even bet a dollar it wouldn’t work out. Walter’s Helitronic product manager not only took the bet he doubled down, saying West Ohio would end up getting a second machine. West Ohio’s first Power machine arrived in January, 1997. They soon needed another one, which arrived in mid-1998. (Note to business executives: Don’t bet against Kerry Buchenroth.)

By the fall of 1998 West Ohio entered the world of PCD tools with an EWAG RS 15 manual machine, and by year end they had their third Helitronic Power CNC machine.

“The banks were going ballistic,” says Kerry. “You can’t grow that fast!” But as Buck put it: “The three of us were saying all we want to do is go home and go to bed. I ran first and second shift. Mom ran first and second. And Dad ran third and first. We were busting at the seams.”

### Early adopters of new technology

In 2001 West Ohio began certifying their tools with micron-level accuracy and repeat-ability with a new Walter Helicheck non-contact measuring machine. In 2002 they became the first company in the US to get a Walter Helitronic Power Diamond, a CNC machine that both grinds and erodes PCD cutting tools. In 2005 West Ohio was one of the first companies in the US to get Walter’s new Helitronic Vision, a machine that features linear motors or torque motors in all axes. “The machine had some hiccups in the beginning but it runs like a top,” says Kerry. “We’ve been loyal to Walter,” adds Buck, “and I have to say, a lot of the business we’ve had over the years has been from Walter contacts. That’s just part of that relationship thing.”

### The employee relationship - Moving machines in your long Johns

When West Ohio moved into its new building the thermometer read 20 below zero and the wind chill factor was 40 to 50 below. “The employees got their long Johns on and all their winter gear and moved us,” recalls Kim. “We moved an entire shop in a day,” remembers Buck, “and lost only two days of production. We brought our portable compressors from home, ran drop cords...” (One of the “lost days” was Christmas!) That kind of dedication comes from excellent employee relations, plus of course the example set by the Buchenroths.

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West Ohio Tool Co.

West Ohio uses an “extended flex-shift” arrangement. They generally overlap to form 1-1/2 shifts, but can expand or contract to meet customer needs. Employees can vary their work hours to suit personal preferences. Chad, for example, comes in about 3:30 AM so he can leave early to play golf every day before picking up his baby. Employees are also allowed to bank time against



Kerry working out a tooling problem with a customer. “Right or wrong, I don’t go in and ask for the sale. I don’t ask ‘what can I sell you today?’ I might hint at it. But 95% of the time we go in and fix problems. And when you can help a customer fix a problem, it just grows.”

future absences, or to get as far as 40 hours behind their commitment without losing pay. Plus West Ohio offers quarterly bonuses and profit sharing.

### **The customer relationship - Solving problems and cutting costs**

These days, Kerry never touches a machine. (They joke that if he stops beside one and reaches for the control someone needs to stop him quickly.) Instead, he's constantly visiting manufacturing engineers "at the spindle," helping them solve machining challenges.

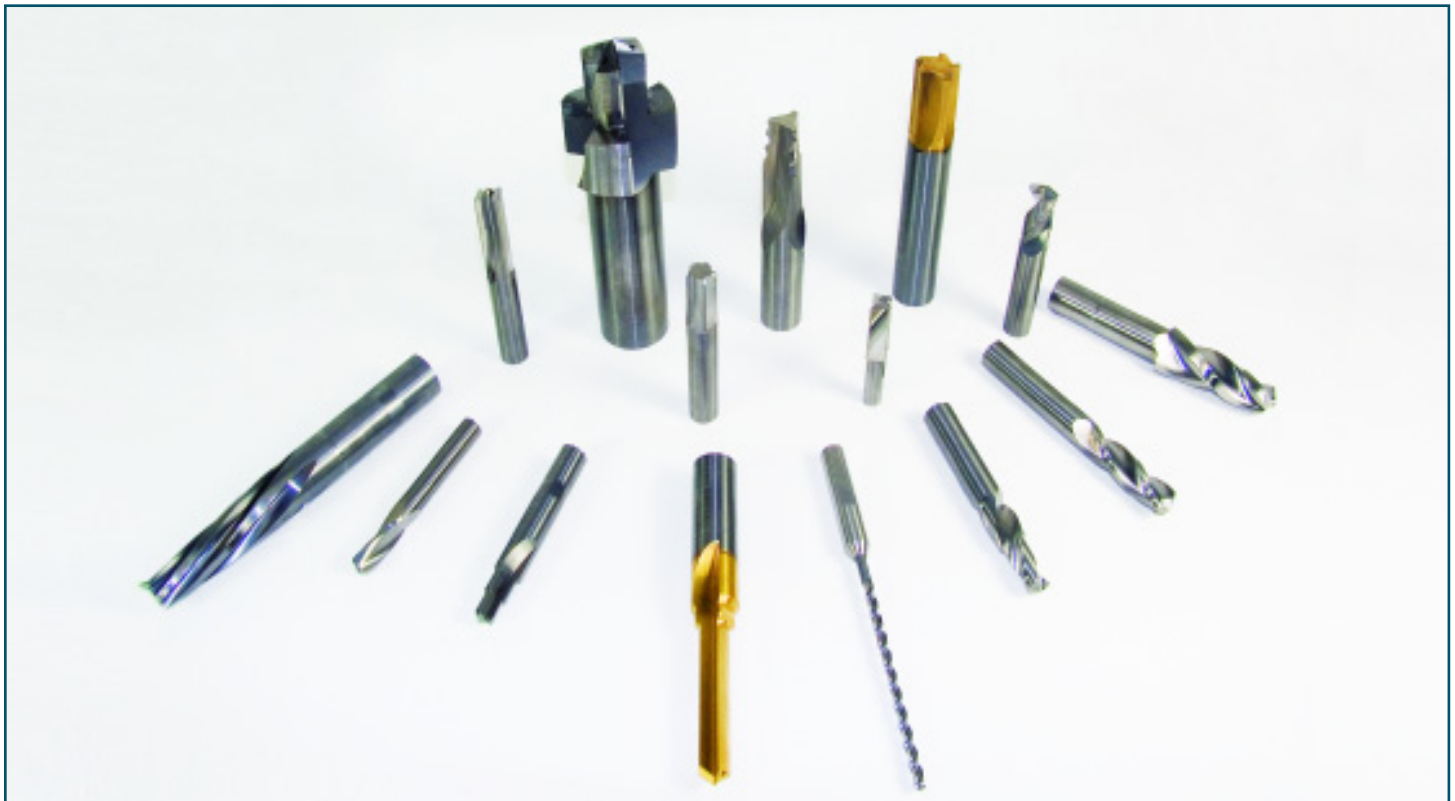
West Ohio's goal is not to make the same tool at a lower cost, although they are very efficient at what they do. Instead they strive to both lower customer tool cost (perhaps by lengthening the duty cycle) and to slash the total cost-per-part by speeding the production rates. This typically means redesigning the tool significantly, based on West Ohio's broad experience with cutting tool geometries and materials and how they affect the machining of a variety of metals. "Sometimes it's just a case of taking two or three tools and combining them into one to save cycle time. Sometimes it's a matter of changing from a straight to a helical, or changing the number of flutes, or changing feeds and speeds. Sometimes it's a case of me bringing a tool back and finding Buck has already been thinking about a redesign, because he sees the regrinds coming through every week," explains Kerry.



**Buck Buchenroth (who was born wearing a baseball cap) invents new tool geometries on a laptop using Walter's Tool Studio software.**

### **Ten-fold improvement in duty cycle**

One West Ohio customer was using a straight flute step reamer on a forged steel part with 15% lead content, plus lots of nickel and manganese. They were getting only 1,200-1,500 hits and five regrinds out of the tool. What's worse, the stringy material produced a "rat's nest" of cut material that forced frequent shut downs and interfered with the robot loader. West Ohio convinced the customer to lengthen the tool, so after several regrinds they could cut the pilot off, spin a new pilot and get



**Just a few of West Ohio's custom cutting tools**

more regrinds out of the tool. They also argued for a helical flute, which the customer insisted would make the “rat’s nest” worse because they’d already tried it. But Buck increased the tool from six to seven flutes and designed a special gash for the end face to address the nesting problem. The customer was willing to try, and the new tool has since proven it can handle 15,000 hits and 30 to 40 regrinds. And it’s \$10 cheaper than the original tool!

### Strange new drill geometries for faster speeds

Buck is probably the first person in the US to use Walter’s new Tool Studio software to vary the helix angle from front to back within a single drill (it’s more common in endmill design now). Why? “Tool Studio is another way for us to solve problems. For example, if there’s a chip evacuation issue. We run into a lot of issues now with combination tools where you take a small pilot and put them on a larger counterbore. The customer needs a 30° helix on the pilot to allow for fast drilling, but you can’t grind it all helically because a 30° helix at the pilot would result in a 50 or 60° helix at the wider counterbore. That “shoulder” would be very sharp and brittle and would break. But if you decrease the counterbore helix to 30° you end up with 12.5° at the pilot, which isn’t fast enough. After banging my head against the computer with Tool Studio I created a helical flute on the pilot and a straight flute on the body. So it changes gears right there at the intersection. But it’s not for the faint of heart.”

Kerry chimes in that “what used to be a two piece tool they’d order, with a carbide insert drill and spot fixtures from Japan with a three to four month delivery time, we’ve now converted to a one-piece tool. Tool life is now increased, because there’s no longer a run-out issue. And we can push that tool harder than a carbide insert.”

### Eliminating third shift

In another case, West Ohio custom designed a tool for an automotive brake application. They combined what had been two tools into one special tool that worked so well the supplier eliminated their third shift. Kerry joked “Oops, we misquoted that tool. We want more money!” He took the same concept to another brake supplier and did the same thing there, but charged the same.

### On-call, on-time tooling engineers

Kerry relates that one customer wanted to hire a tooling engineer and asked for advice on what to look for. “Turns out they couldn’t find anybody like that. So they asked Buck and me if we would be their tooling engineer. So we said ‘yeah, we’ll help you out.’ That’s how you build these relationships.” They also inventory



When word got out that United Grinding’s Janette Dywasuk is from Michigan there were mock shouts of dismay, thrown shop rags, and the Ohio State fight song suddenly blasted from the shop radio (it’s a Friday tradition). Then Russ snuck off and returned to present Janette with a box decorated with Ohio State iconography and containing treasures like a red tool tube filled with buckeyes and the Ohio State National Championship commemorative Coke can. West Ohio’s team works hard and has fun doing it.

customer end products, plus the associated West Ohio tools, as a handy reference in case the customer expresses a problem with machining some aspect of a part.

Meeting delivery times is another way to maintain those relationships. Every tool moving through West Ohio is bar coded and scanned as it completes the intended operation at each station. It all feeds into a central computer so that can always track where every job is. About 95-98% of their business is within the 4-6 week delivery window, but they do offer faster service at a premium. Their basic philosophy is to partner with the customer to make big tool improvements and then to keep them “out of crisis mode.” If a crisis does occur, West Ohio maintains an inventory of raw bar stock and can cut and prep blanks in-house.

### It’s a relationship thing

The answer to lowering your cost-per-part just might be a relationship with a company like West Ohio Tool. Just don’t tell them you’re from Michigan. ■